Ephemeris for finding the Positions of the Satellites of Mars,
1883-84.   By A. Marth.

The major and minor semi-axes a and b of the apparent ellipses described by the satellites, the longitudes $u - U$ of the satellites reckoned in their orbits from the points which are in superior conjunction with the centre of the planet, and the angle of position P of the minor axes of the apparent orbits are approximately the following :—

	Phobos.					*Deimos.*			
Greenw. Noon. 1883.	a_1	b_1	$u_1 - U$	Diff. 2250° +	P	a_2	b_2	$u_2 - U$	Diff. 570° +
Dec. 19	15ʺ·38	+4ʺ·93	36°·05	7·68	4°·56	38ʺ·42	+12ʺ·32	271ʺ·99	0·25
21	15·64	5·00	133·73	·73	4·62	39·06	12·49	122·24	·30
23	15·90	5·06	231·46	·78	4·65	39·71	12·65	332·54	·36
25	16·16	5·12	329·24	·84	4·65	40·36	12·79	182·90	·41
27	16·42	5·18	67·08	·89	4·61	41·01	12·93	33·31	·47
29	16·68	5·23	164·97	·93	4·54	41·65	13·06	243·78	·52
31	16·93	5·27	262·90	7·99	4·43	42·29	13·17	94·30	·57
1884. Jan. 2	17·18	+5·31	0·89	8·05	4·29	42·92	+13·26	304·87	0·63
4	17·43	5·34	98·94	·09	4·12	43·54	13·34	155·50	·68
6	17·67	5·36	197·03	·14	3·91	44·14	13 40	6·18	·74
8	17·90	5·38	295·17	·19	3·67	44·72	13·44	216·92	·78
10	18·12	5·39	33·36	·24	3·40	45·27	13·47	67·70	·83
12	18·33	+5·39	131 60	8·28	3·09	45·79	+13·47	278·53	·88
14	18·53	5·38	229·88	·32	2·75	46·28	13·45	129·41	·93
16	18·71	5·37	328·20	·35	2·39	46·73	13·40	340·34	0·96
18	18·87	5·34	66·55	·39	2·00	47·13	13·33	191·30	1·00
20	19·01	5·30	164·94	·41	1·59	47·48	13·24	42·30	·03
22	19·13	+5·26	263·35	8·44	1·15	47·77	+13·13	253·33	·06
24	19·22	5·20	1·79	·45	0·69	48·01	12·99	104·39	·08
26	19·29	5·14	100·24	·47	0·21	48·19	12·83	315·47	·10
28	19·34	5·07	198·71	·47	359 73	48·31	12·66	166·57	·10
30	19·36	4·99	297·18	·47	359·23	48·36	12·46	17·67	·11
Feb. 1	19·35	+4·90	35·65	·46	358·73	48·34	+12·25	228·78	·10
3	19·32	4·81	134·11	·45	358·23	48·26	12·02	79·88	·10
5	19·26	4·72	232·56	·43	357·74	48·11	11·79	290·98	·08
7	19·18	4·62	330·99	·40	357·25	47·90	11·55	141·06	·06
9	19·07	4·52	69·39	·37	356·77	47·63	11·30	353·12	·04

		Phobos.						*Deimos.*		
Greenw. Noon. 1884.	a_1	b_1	u_1-U	Diff. 2230° +	P	a_2	b_2	u_2-U	Diff. 570° +
Feb. 11	18″·94	+4″·42	167°·76	8·34	356°·31	47″·30	+11″·05	204°·16	1·00
13	18·78	4·32	266·10	·30	355·86	46·92	10·80	55·16	0·97
15	18·61	4·22	4·40	·26	355·44	46·49	10·56	266·13	·93
17	18·42	4·13	102·66	·21	355·04	46·01	10·32	117·06	·89
19	18·21	4·04	200·87	·17	354·67	45·49	10·09	327·95	·85
21	17·99	+3·95	299·04	8·12	354·32	44·94	+9·86	178·80	·80
23	17·76	3·86	37·16	·07	354·00	44·36	9·64	29·60	·76
25	17·51	3·78	135·23	8·01	353·71	43·75	9·44	240·36	·71
27	17·26	3·70	233·24	7·96	353·45	43·12	9·24	91·07	0·65
29	17·00	3·63	331·20	·91	353·23	42·47	9·06	301·72	·60
Mar. 2	16·74	+3·56	69·11	7·85	353·04	41·81	+8·90	151·32	·55
4	16·47	3·50	166·96	·80	352·88	41·14	8·74	2·87	·50
6	16·20	3·44	264·76	·75	352·76	40·47	8·60	213·37	·45
8	15·93	3·39	2·51	·70	352·67	39·79	8·47	63·82	·40
10	15·66	3·34	100·21	7·64	352·61	39·12	8·35	274·22	0·36
12	15·39	+3·30	197·85		352·58	38·45	+8·25	124·58	

These values are to be interpolated for the times for which the positions of the satellites are required, the equation of time having already been taken into account. The position-angles p and distances s are then to be found by means of the formulæ:—

$$s \sin (p-P) = a \sin (u-U)$$
$$s \cos (p-P) = b \cos (u-U)$$

The satellites move in the direction of *increasing* position-angles, and will be at their greatest eastern and western elongations (e in pos. $P+90°$ and w in pos. $P-90°$) about the following hours, Greenwich Mean Time:—

	Phobos.	*Deimos.*		*Phobos.*	*Deimos.*
1883.	h h	h	1883.	h h	h
Dec. 19	12·6 *w* 16·5 *e*	15·0 *e*	Dec. 24	11·3 *e* 15·1 *w*	16·2 *e*
20	11·6 *w* 15·4 *e*	21·3 *e*	25	10·2 *e* 14·0 *w*	7·3 *w*
21	10·6 *w* 14·4 *e*	12·4 *w*	26	9·2 *e* 13·0 *w*	13·6 *w*
22	9·5 *w* 13·3 *e*	18·7 *w*	27	12·0 *w* 15·8 *e*	19·9 *w*
23	12·3 *e* 16·1 *w*	9·9 *e*	28	10·9 *w* 14·7 *e*	11·1 *e*

1883.	Phobos h	Phobos h	Deimos h	1884.	Phobos h	Phobos h	Deimos h
Dec. 29	9·9 w	13·7 e	17·3 e	Feb. 4	9·5 w	13·3 e	7·1 e
30	12·7 e	16·5 w	8·5 w	5	8·4 w	12·3 e	13·4 e
31	11·6 e	15·5 w	14 8 w	6	11·2 e	15·1 w	19·6 e
1884.				7	10·2 e	14·0 w	10·8 w
Jan. 1	10·6 e	14·4 w	5·9 e	8	9·1 e	13·0 w	17·0 w
2	9·5 e	13·4 w	12·2 e	9	8·1 e	11·9 w	8·2 e
3	12·3 w	16·2 e	18·5 e	10	10·9 w	14·7 e	14·4 e
4	11·3 w	15·1 e	9·6 w	11	9·8 w	13·7 e	20·7 e
5	10·2 w	14·1 e	15·9 w	12	8·8 w	12·6 e	11·8 w
6	9·2 w	13·0 e	7·0 e	13	7·7 w	11·6 e	18·1 w
7	12·0 e	15·8 w	13·3 e	14	10·5 e	14·3 w	9·2 e
8	10·9 e	14·8 w	19·6 e	15	9 5 e	13·3 w	15·5 e
9	9·9 e	13·7 w	10·7 w	16	8·4 e	12·3 w	6·6 w
10	8·9 e	12·7 w	17·0 w	17	7·4 e	11·2 w	12·9 w
11	11·6 w	15·5 e	8·1 e	18	10·2 w	14·0 e	19·1 w
12	10·6 w	14·4 e	14·4 e	19	9·1 w	12·9 e	10·3 e
13	9·5 w	13·4 e	5·6 w	20	8·1 w	11·9 e	16·5 e
14	8·5 w	12·3 e	11·8 w	21	7·0 w	10·9 e	7·7 w
15	11·3 e	15·1 w	18·1 w	22	9·8 e	13·6 w	13·9 w
16	10·2 e	14·1 w	9·2 e	23	8 8 e	12·6 w	20·2 w
17	9·2 e	13·0 w	15·5 e	24	7·7 e	11·6 w	11·4 e
18	12·0 w	15·8 e	6·2 w	25	6·7 e	10·5 w	17·6 e
19	10·9 w	14·8 e	12·9 w	26	9·5 w	13·3 e	8·8 w
20	9·9 w	13·7 e	19·1 w	27	8·4 w	12·3 e	15·0 w
21	8·8 w	12·7 e	10·3 e	28	7·4 w	11·2 e	6·2 e
22	11·6 e	15·4 w	16·5 e	29	6·4 w	10·2 e	12·5 e
23	10·6 e	14·4 w	7·7 w	Mar. 1	9·1 e	13·0 w	18·7 e
24	9·5 e	13·4 w	13·9 w	2	8·1 e	11·9 w	9·9 w
25	8·5 e	12·3 w	20·2 w	3	7·1 e	10·9 w	16·2 w
26	11·3 w	15·1 e	11·3 e	4	9·8 w	13·7 e	7·3 e
27	10·2 w	14·0 e	17·6 e	5	8·8 w	12·6 e	13·6 e
28	9·2 w	13·0 e	8·7 w	6	7·8 w	11·6 e	4·8 w
29	11·9 e	15·8 w	14·9 w	7	6·7 w	10·6 e	11·1 w
30	10·9 e	14·7 w	6·1 e	8	9·5 e	13·3 w	17·3 w
31	9·9 e	13·7 w	12·3 e	9	8·5 e	12·3 w	8·5 e
Feb. 1	8·8 e	12·6 w	18·6 e	10	7·4 e	11·3 w	14·8 e
2	11·6 w	15·4 e	9·7 w	11	6·4 e	10·2 w	5·9 w
3	10·5 w	14·4 e	16·0 w	12	9·2 w	13·0 e	12·2 w

In order to determine the longitudes of the satellites in their orbits properly it is essential that observations should be taken when the satellites are as far away from their greatest elongations as they can be seen.

In extending the ephemeris as far as it is given I have been guided by the circumstance that *Deimos* has been observed for position at the Harvard College Observatory on Jan. 10, 1880.

Erratum.

Vol. XLIII., page 285, 1882, Oct. 24, *for* Reapp. 51 Piscium, *read* Disapp. 51 Piscium.